

## WHAT IS CLAIMED IS:

- 1                   1.       A method for transporting elemental sulfur comprising:  
2                   (a) combining said elemental sulfur with a non-aqueous liquid carrier  
3                   comprising a member selected from the group consisting of anhydrous ammonia and  
4                   sulfur dioxide to form a fluid mixture, and  
5                   (b) conveying said fluid mixture by way of a transport vessel.
- 1                   2.       The method of claim 1 in which (b) is performed in the absence of any  
2                   temperature control of said transport vessel other than by exposure to environmental  
3                   conditions.
- 1                   3.       The method of claim 1 in which said fluid mixture is a slurry of solid  
2                   elemental sulfur in a liquid solution of sulfur dissolved in said non-aqueous liquid carrier.
- 1                   4.       The method of claim 1 in which said transport vessel is a pipeline, and  
2                   (b) comprises pumping said fluid mixture through said pipeline.
- 1                   5.       The method of claim 4 in which said pipeline has an inner surface of  
2                   ferrous metal in contact with said fluid mixture.
- 1                   6.       The method of claim 4 in which said pipeline is surrounded by air.
- 1                   7.       The method of claim 4 in which said pipeline is an underground  
2                   pipeline.
- 1                   8.       The method of claim 4 in which said pipeline is an underwater  
2                   pipeline.
- 1                   9.       The method of claim 1 in which said non-aqueous liquid carrier is  
2                   anhydrous ammonia.
- 1                   10.      The method of claim 9 in which said elemental sulfur constitutes at  
2                   most about 65% by weight of said fluid mixture.
- 1                   11.      The method of claim 9 in which said elemental sulfur constitutes from  
2                   about 20% to about 65% by weight of said fluid mixture.
- 1                   12.      The method of claim 9 in which said elemental sulfur constitutes from  
2                   about 40% to about 60% by weight of said fluid mixture.

1                   **13.**     The method of claim 9 in which said elemental sulfur constitutes from  
2     about 50% to about 60% by weight of said fluid mixture.

1                   **14.**     The method of claim 9 in which (b) is performed at a temperature less  
2     than or equal to 35°C.

1                   **15.**     The method of claim 9 in which (b) is performed at a temperature less  
2     than or equal to 20°C.

1                   **16.**     The method of claim 1 in which said non-aqueous liquid carrier is  
2     sulfur dioxide.

1                   **17.**     The method of claim 16 in which said elemental sulfur constitutes at  
2     most about 65% by weight of said fluid mixture.

1                   **18.**     The method of claim 16 in which said elemental sulfur constitutes  
2     from about 1,800 ppm by weight to about 65% by weight of said fluid mixture.

1                   **19.**     The method of claim 16 in which said elemental sulfur constitutes  
2     from about 1% by weight to about 60% by weight of said fluid mixture.

1                   **20.**     The method of claim 16 in which said elemental sulfur constitutes  
2     from about 10% by weight to about 50% by weight of said fluid mixture.

1                   **21.**     The method of claim 16 in which (b) is performed at a temperature less  
2     than or equal to 40°C.

1                   **22.**     The method of claim 16 in which (b) is performed at a temperature less  
2     than or equal to about 20°C.

1                   **23.**     A method for extracting elemental sulfur from a sulfur-containing,  
2     substantially water-free geologic formation, said method comprising:

3                   (a) purging said geologic formation with anhydrous ammonia to form a liquid  
4                   solution of elemental sulfur from said geologic formation dissolved in anhydrous  
5                   ammonia, and

6                   (b) recovering elemental sulfur from said liquid solution.

1                   **24.**     The method of claim **23** further comprising recycling to (a) at least a  
2     portion of said ammonia remaining after recovery of elemental sulfur from said liquid  
3     solution in (b).

1                   **25.**     The method of claim **23** in which said geologic formation is a geologic  
2     mineral formation.

1                   **26.**     A method for extracting elemental sulfur from a sulfur-containing,  
2     substantially water-free mineral formation, said method comprising:

3                   (a) purging said mineral formation with anhydrous ammonia to form a liquid  
4     solution of elemental sulfur from said mineral formation dissolved in anhydrous  
5     ammonia, and

6                   (b) recovering elemental sulfur from said liquid solution.

1                   **27.**     The method of claim **26** further comprising recycling to (a) at least a  
2     portion of said ammonia remaining after recovery of elemental sulfur from said liquid  
3     solution in (b).

1                   **28.**     A method for extracting elemental sulfur from substantially anhydrous  
2     carbonaceous solids, said method comprising:

3                   (a) purging said solids with anhydrous ammonia to form a liquid solution of  
4     elemental sulfur from said solids dissolved in anhydrous ammonia, and

5                   (b) recovering elemental sulfur from said liquid solution.

1                   **29.**     The method of claim **28** further comprising recycling to (a) at least a  
2     portion of the ammonia remaining after recovery of elemental sulfur from said liquid solution  
3     in (b).

1                   **30.**     A method for storing elemental sulfur comprising combining said  
2     elemental sulfur with anhydrous ammonia to form a liquid solution or suspension, and  
3     depositing said solution or suspension in a substantially water-free subterranean formation.

1                   **31.**     The method of claim **30** further comprising withdrawing anhydrous  
2     ammonia from said formation apart from said sulfur, for re-use.

- 1                    **32.**    A composition of matter consisting essentially of a solution or  
2    suspension formed by combining elemental sulfur with liquid sulfur dioxide.